



The United States' Strategy for Securing Critical Minerals Supplies Can It Meet the Needs of the IRA?

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► Key Takeaways

- To secure its critical mineral supplies, the United States (US) remains dependent from foreign countries. Graphite, manganese and many rare earth elements (REEs) are, indeed, rare occurrences in the country while deposits of nickel or cobalt are dwarfed by the giants in the Democratic Republic of Congo, Indonesia, or the Philippines.
- With the aim of reducing these dependencies, the Inflation Reduction Act (IRA), established in 2022, adopts a nationalistic approach to mineral sourcing by requiring a market-value based target for critical mineral content to benefit from its tax credits.
- Nevertheless, this strategy and its related actions could be insufficient to succeed in the task of significantly increasing the US sovereignty on critical minerals, in the short-term. The law, under its current material requirements, is unlikely to be fulfilled and only a softening of its sourcing rules could align with the geological and geopolitical realities of critical minerals production.

Introduction

The United States (US) reliance on foreign supplies of raw and processed critical minerals is pressing Washington to devise a strategy to secure short-, medium- and long-term solutions. Pressure only increased with the booming demand spurred partly by the Inflation Reduction Act's (IRA) policies.¹

The US goal to become carbon pollution-free electricity by 2035 and reach net-zero greenhouse gas emissions by 2050² requires a complete overhaul of the structure of critical minerals production and supplies within the country as well as abroad to meet future demand and build resilience from China. This *Memo* assesses recent progress and whether it can help deliver on the IRA provisions.

Critical minerals, low-carbon transition, and geopolitics

Critical minerals are defined as 50 resources that are used extensively in low-carbon and new technologies. Out of these minerals, the country is 100% reliant on imports for 12 and more than 50% import-dependent for another 31 of them.³

The US is deprived of any graphite and manganese mines. The limited amounts of lithium extracted in Nevada, nickel in Michigan, and cobalt in Idaho (currently paused) are far from sufficient to cover the needs of the country's green technology manufacturing. In foreign strategic jurisdictions, American mining companies have had little success securing rich lithium, nickel, or cobalt deposits, often relying on allied countries (Canada or Europe). Thus, the urgency to establish a domestic supply chain of cobalt, nickel, germanium, or gallium, among others, is increasingly felt in Washington. In parallel, attracting interest from foreign powerhouses of critical mineral extraction seems to have been a focus of the current administration with more or less success.

US legislative background, incentivization policies, and mining law limitations

The concept of critical minerals in the US goes back to World War II and the long-standing use of strategic metal stockpiling. The neoliberal deregulation era coincided with a lessening of the security-focused approach to minerals, meaning the geopolitical and environmental-economic trends aligned to allow domestic mining to disappear.

1. National Research Council et al., *Minerals, Critical Minerals, and the U.S. Economy*, Washington, DC: National Academies Press, 2008, available at: <https://nap.nationalacademies.org>.

2. US Department of Energy, "On the Path to 100% Clean Electricity", Washington, DC: US DoE, May 2023.

3. Payne Institute for Public Policy, "The State of Critical Minerals – Report 2023", The Colorado School of Mines, September 2023, available at: <https://payneinstitute.mines.edu>.

Now, a new alignment of trends is making that unacceptable. Contemporary conceptions of critical minerals in legislation first appeared with the Energy Act of 2020, which tasked the United States Geological Survey (USGS), an agency of the Department of the Interior, to designate a list of these minerals. This was completed in 2022 with the release of the list of 50 critical minerals guiding the American strategy to secure the mining, processing, trade, and final uses of these products. In parallel, the Department of Energy published a Critical Materials Assessment,⁴ which encompasses both the USGS list as well as adding those materials deemed critical for energy production. Finally, the US Defense Logistics Agency (USDLA), an agency under the Department of Defense, also released a list of 45 strategic minerals of interest⁵ overlapping with the USGS list. The USDLA also received increasing funding to ramp up the strategic storage of critical minerals in the current context of low prices.⁶ The following legislative and executive tools defined the need for critical minerals in the US:

- The Energy Act 2020 defined critical minerals and requested USGS to establish a list of these minerals.
- Presidential Executive Order No. 13817 requested that the USGS determine possible domestic sources of critical minerals that could offset or eliminate import reliance.
- Presidential Executive Order No. 14017 ordered a review of critical mineral and material supply chain vulnerabilities.
- Secretarial Order No. 3359 implemented Presidential Executive Order No. 13817.
- The Inflation Reduction Act of 2022 creates incentives to increase the production of critical minerals by shifting to low-carbon products.

Critical minerals development within the US is then bounded by the existing mining legislation at the federal and state levels. A recurring critique about establishing domestic production resides in the complexity of mining companies' securing both environmental permits and social licenses to operate. The permitting process is located within the Department of the Interior, particularly the Environmental Protection Agency (EPA), the Army Corps of Engineers, the Bureau of Land Management (BLM) and the Forest Service. The Mining Law of 1872 governs the extraction of minerals on federal lands, constituting most current exploration and exploitation projects. The consequence of these delays significantly impacts the industry, with a permitting process that lasts from 7 to 10 years.⁷

4. "U.S. Department of Energy Releases 2023 Critical Materials Assessment to Evaluate Supply Chain Security for Clean Energy Technologies", US Department of Energy, 2023, available at: www.energy.gov.

5. "Materials of Interest", Defense Logistics Agency, n.d., available at: www.dla.mil/Strategic-Materials.

6. P. Desai, "Exclusive: US Explored Adding More Cobalt to Defence Stockpiles, Sources Say", Reuters, March 18, 2024, available at: www.reuters.com.

7. "Delays in the U.S. Mine Permitting Process Impair and Discourage Mining at Home", SNL Metals and Mining, n.d., available in PDF at: <https://nma.org>.

In the meantime, Neighboring Canada is engaged in a process to speed up permitting,⁸ partly to erode the dominance of the Chinese industry. This explains in part the limited spending on mining exploration in the US, which represents only 11% of the world's total.

The Inflation Reduction Act's Impact on mineral demand

Many perceive the IRA of 2022 as a significant driver in the increase in mineral demand driven by green transition policies. The Act confers almost 500 billion dollars (\$) in tax credits to ensure the transition to low-carbon and decarbonization technologies within the US. It introduces a New Advanced Manufacturing Production Credit, which incentivizes domestic production of components, including critical minerals, with a tax credit equal to 10% of the cost of production.⁹

S&P Global found that the Act will drive additional demand for lithium, nickel, cobalt, and copper to another 15%, 14%, 13% and 12% respectively.¹⁰ Combined with the Energy Act and the Biden's administration push to secure domestic supplies, the IRA is expected to define the establishment of new extraction and transformation operations in the country. In 2024, the DoE received an application for more than \$42 billion under Section 48C of tax credit for re-equip, expand or establish an industrial facility to process, refine or recycle critical minerals.¹¹ A large part of this investment resides in corporate tax credits but also renews taxpayers' credit to acquire EVs. A move at odds with other countries is slowly phasing out their own individual tax credit systems. However, the IRA adopts a nationalistic approach to mineral sourcing by requiring a market-value-based target for critical mineral content to benefit from tax credits. Thus, by 2027, to benefit from these tax credits, an EV should be built at 80% of the market value of critical minerals in its battery sourced domestically or from US free-trade partners (FTA). With a dependency on imports from non-FTA countries of 77% for cobalt and 46% for lithium and nickel, the IRA goals appear less than likely to be achieved.¹² On the other hand, a recent analysis showed how billions in subsidies up and down the supply chain could be unlocked if even a few domestic critical mineral mines come online.¹³

8. "Canada to Speed Up Critical Minerals Permits in Bid to Erode China's Dominance", Mining.com, 2023, available at: www.mining.com.

9. "Inflation Reduction Act 2022: Sec. 13502 Advanced Manufacturing Production Credit", International Energy Agency, 2023, available at: www.iea.org.

10. "Inflation Reduction Act: Impact on North America Metals and Minerals Market", S&P Global, August 2023, available in PDF at: <https://c212.net>.

11. M. Connors, "The Inflation Reduction Act as a Mining Finance Alternative", Mayer Brown, March 2024, available at: www.mayerbrown.com.

12. H. Lazenby, "US Inflation Reduction Act Impact Report Lays Bare Critical Mineral Supply Fault Lines", Mining.com, 2023, available at: www.mining.com.

13. J. Temple, "How One Mine Could Unlock Billions in EV Subsidies", MIT Technology Review, 2024, available at: www.technologyreview.com.

The IRA directly funnels up to \$10 billion of increased funding for the mining sector through tax credits mobilizing the Qualifying Advanced Energy Project Credit Program. The recent listing of copper as a critical material by the DoE, making it eligible for tax credits, led to an allocation of \$4 billion specifically for this mineral. In comparison, the Department received applications for more than \$42 billion, ten times the allocated amount.¹⁴ Similarly, as a financing vehicle, the IRA establishes the advanced manufacturing production credit, which ensures an annual tax credit of 10% of the costs incurred to produce critical minerals.¹⁵ This tool is aimed to be a stable mechanism, providing a long-term perspective to critical mineral producers in an industry marked by boom-and-bust cycles. Finally, with more than \$500 million in incentives for critical minerals developments aligning with the Defense Production Act's stockpiling strategy, the IRA increases again the potential positive economic outcomes of the industry.¹⁶ Thus, the IRA acts as a financing mechanism to boost mining production across the country. The incentives, however, are not only located within the extractive sector and processing plants are getting built through positive perspectives on the battery market supported by both the IRA and the Infrastructure Investment and Jobs Act.¹⁷

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The IRA also transfers part of the burden of supplying these minerals onto the US and allied countries' communities. The policy largely ignores the environmental and social impacts of a sudden growth in mineral demand and the obligation of domestic sourcing it entails. Beyond the impacts on communities, the IRA's targets are jeopardized by a continuously long permitting process, as well as the risks for litigation following permit approval. The US federated system, with its complex interlinkages of federal, state, and local rights, as well as private and public land ownership, will prove complex to navigate to achieve IRA's goals. Additionally, contradictory decisions of federal land withdrawal and the cancellation of mineral leases, as was the case for Twin Metals in Minnesota, also underline the lack of a united domestic approach. Internationally, the limited FTA signed by the US and their focus on copper producers forgo the need to significantly increase cobalt, lithium, manganese, nickel, or REEs supplies. The US is now scrambling to sign such agreements with other countries, a strategy that also underlines the lack of a fully coherent strategy.

14. M. Connors, "The Inflation Reduction Act as a Mining Finance Alternative", op. cit.

15. M. Blair, "The Inflation Reduction Act: Mining Focus", Barr, 2022, available at: www.barr.com.

16. "Mine 2023: The Era of Reinvention", PwC, 2023, available at: www.pwc.com.

17. C. Moors, "IRA at 1: Speed of Mining Investments Surprises Experts", S&P Global, 2023, available at: www.spglobal.com.

Domestic supply strategies: between mining, re-mining, and reprocessing

While the US has only a limited number of mines, often of relatively small size, deposits and reserves of critical minerals are common in the lower 48 states and Alaska. The USGS identified 681 deposits containing one or more critical minerals.¹⁸ In the Western United States, deposits of 21 critical minerals dot the region, with a particular concentration in Utah, Nevada, and Arizona.¹⁹ However, the growing focus on mineral extraction in regions with a history of extractivism, in land traditionally under indigenous management (reservations or ceded), or with communities marked by nimbyism makes it particularly hard to establish mining and/or processing. To achieve production, three approaches are considered as a source of domestic supplies of critical minerals – opening of new mines, reprocessing of mine wastes, and the recovery of byproducts from mines already in operation. Nevertheless, even with the opening of new operations, the geological reality of ore deposits does not confer the ability to fully cover its minerals' needs to the US. Thus, foreign sourcing will remain an important factor.

The Mountain Pass mine in California is worth exploring as the operation, dormant for decades, now supplies an estimated 15% of global heavy rare earth elements (HREEs).²⁰ The mine suffers from the US lack of processing capabilities and sells its production to China for refining, thus limiting the ability to counteract the Asian nation's domination in HREEs. However, MP Materials, the mine operator, has been mobilizing capital to develop separation and purification processes in-house, completed in 2023. The DoD provided more than \$35 million in funding through Executive Order 14017, America's Supply Chains.²¹ Nevertheless, the financial stability of the company in a global competitive environment marked by Chinese overproduction and dropping prices raises questions about the ability of MP Materials to pursue the project. In 2024, the company suffered important financial losses and a failed merger with Lynas Rare Earths.²² Nevertheless, it remains unlikely that in the context of increasing competition, as well as China's ban on REEs processing technology exports, Washington is forced to complete an overhaul of its industry. In this, MP Materials and Lynas Rare Earth are likely to play a significant role with the financial backing of the US government.

18. "Critical Mineral Deposits of the United States", USGS, 2023, available at: www.usgs.gov.

19. P. Vikre, D. John, N. E. Wintzer, et al., "Critical Minerals in Subduction-related Magmatic-Hydrothermal Systems of the United States Scientific Investigations Report", 2023.

20. L. Seligman, "China Dominates the Rare Earths Market. This U.S. Mine Is Trying to Change That", *Politico*, December 14, 2022, available at: www.politico.com.

21. "DoD Awards \$35 Million to MP Materials to Build U.S. Heavy Rare Earth Separation Capacity", US Department of Defense, February 22, 2022, available at: www.defense.gov.

22. "MP Materials Swings to Quarterly Loss on Falling Rare Earth Prices", Reuters, February 22, 2024, available at: www.reuters.com.

The opening of new mines is likely the most visible response to critical minerals securitization and the one drawing the most opposition. Lithium from the proposed Thacker Pass mine and nickel-copper-cobalt from the Tamarack operation have been consistently criticized by Indigenous and non-Indigenous communities. Today, only a few mines extract cobalt, lithium, or nickel as primary products, while graphite and manganese operations are inexistent. Thus, the White House and Department of Energy push to support new mine development while hoping to create a consensus on the shared value for the American people and economy. Nevertheless, from a domestic supply chain perspective, opening a mine is meaningless unless it is accompanied by the development of processing capacities, allowing the US industry to both extract and transform critical minerals within its borders. As such, a few vertically integrated projects, with mine and refinery both located on-site, have also been proposed as a way to counter social opposition. The combination of both operations significantly decreases their footprints, thus limiting their exposure to criticism.

The reprocessing of mine wastes is another strategy deployed by the US industry to address the country's shortage of critical minerals production. It is estimated that 100,000 abandoned mines are in the US, most of which are legacy operations that focused on a single ore and operated with technologies limiting the ability of effective recovery. In many cases, the waste created by these mines is still rich in minerals. The reprocessing of these is attempted in a few operations, such as the one by Missouri Cobalt working on legacy lead mines. While still rare, the reprocessing of mine wastes constitutes a significant potential supply of critical minerals within the US. The process has also been embraced in foreign jurisdictions, with the example of Eurasian Resources Group (ERG) Metalkol operation in the Democratic Republic of Congo (DRC), operating one of the most profitable cobalt mines with the reprocessing of historic tailings. One of the major obstacles to reprocessing is liability laws that are generally interpreted to transfer all responsibility for environmental conditions to any company that disturbs legacy wastes. So-called "good Samaritan" policies have been proposed as a solution to reduce these liabilities and unlock legacy waste resources but have not advanced.

Recovering byproducts of existing operating mines is highly dependent on economics and technical feasibility. The giant Bingham Canyon copper mine, operated by a subsidiary of Rio Tinto, is also developing a recovery system for tellurium. The benefits of byproduct recovery are clear – a smaller footprint integrated into operations that are often more or less accepted within the communities and limited investment. Nevertheless, while the economics are more favorable than the opening of a new mine, the cost of processing these byproducts, as well as their limited value, often limits the interest of companies to enter into such investments.

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Thus, the US domestic strategy to secure supplies of critical minerals is based on three methods of extraction, each with benefits and risks. The social opposition to extractivism is often strong in the country and limits the ability of companies to quickly secure environmental permits and social licenses to operate. Beyond these socio-economic and environmental obstacles, the US geological wealth remains limited regarding critical minerals. Graphite, manganese, and many REEs are rare occurrences, while the giants in the DRC, Indonesia, or the Philippines dwarf deposits of nickel or cobalt. This geological reality requires the country to secure foreign supplies.

Foreign supplies through friend-shoring

At the international level, the US is engaged in a race to secure both deposits and supplies of critical minerals. Competing against Chinese interests that have deployed significant financial and political efforts in the past 20 years, the US is facing an uphill battle. American mining companies operating abroad are limited in their material scopes, often focusing on copper and gold, while their Chinese competitors are increasingly securing cobalt, lithium, nickel, and REEs deposits. Thus, in recent years, the Biden administration mobilized Washington's political influence to secure these supplies and limit China's influence.

The US is engaged in a race to secure both deposits and supplies of critical raw materials

The US dependency on foreign supply differs significantly between minerals. REEs production is dominated by Chinese deposits and mines, making it difficult to engage directly with the production side. However, other critical minerals are located in countries that are less antagonistic to US interests, facilitating a friendshoring strategy. This effort is particularly visible in Central Africa with the DRC's cobalt production.

Anthony Blinken, the US Secretary of State, made a recent trip to Angola that largely focused on developing the Lobito corridor aimed at winding down the Chinese control of the cobalt-rich Copperbelt. The 1,866-kilometer railway project would allow the export of cobalt and copper products from the DRC's southern provinces to the Atlantic coast towards the US (and potentially the European Union). The project is part of Washington's seduction strategy in the region, with the signature in 2023 of a memorandum of understanding promising the development of EV battery products manufacturing in both Zambia and the DRC. The friend-shoring approach is also clearly seen politically with the US's unwary support of President Tshisekedi of DRC, particularly against former Sinophile President Kabila.

The IRA also plays a critical role in the sourcing from foreign countries with which the US maintains FTAs. It effectively bans individual subsidies on EVs built with minerals originating from a "foreign entity of concern" (FEOC). Foreign entities under US law encompass foreign governments, persons, organizations, or a US-registered company controlled by one of the above-mentioned categories. FEOC are defined as foreign entities

which are domiciled in one of the four covered countries (China, Russia, North Korea, and Iran) or extract, process, or recycle critical minerals, as well as manufacture and assemble components in these countries.²³ While North Korea and Iran remain marginal players in the critical minerals sphere, Russian nickel deposits, Chinese rare earth and graphite production, and cobalt, lithium, and nickel transformation place the two countries at the core of global supplies. This situation has the potential to significantly disrupt critical minerals supplies for US battery and car manufacturers while increasing the price of American-made EVs excluded from tax incentives.

Additionally, FTAs with critical mineral-producing jurisdictions are limited. Indonesia, a major nickel producer or the DRC and its immense cobalt resources do not have FTAs with the US. Researchers found that 59% of lithium imports to the US originated from Argentina,²⁴ a non-FTA country. As of this writing, only Australia, Canada, Chile, and Peru signed an FTA²⁵ and are major suppliers of copper, lithium, and, to a lower extent, cobalt and nickel. Thus, beyond negotiations to sign agreements that can take years, the IRA is effectively placing the burden of increased mineral production on close allies as well as domestic operations. Finally, the new role of the US International Development Finance Corporation in targeted investment in strategic companies located abroad, in non-FTA countries, could provide an idea of the strategy that the US government aims to develop in the coming years. The organization invested more than \$105 million in Brazilian-based TechMet, an investment company aiming at developing critical minerals extraction, transformation, and trade.²⁶ In the next few years, this strategy of indirect capital mobilization could play an important role in US public investments in critical minerals abroad.

**Russia and China:
two countries at the
core of global
supplies**

Involvement of non-mining operator in the critical minerals sphere

Recently, a string of investments of non-mining operators, including traditionally downstream clients to the mining industry, has led to speculations about the role of these actors in securing critical minerals supplies. Exxon's \$100 million deal for lithium drilling rights in Arkansas, General Motors' \$650 million stake in Lithium Americas, Tesla's opening of a lithium refinery in Texas, and Ford's political demands for streamlining mining permitting all play in the same direction. Faced with significant geopolitical

23. "Interpretation of Foreign Entity of Concern", Federal Register, December 4, 2023, available at: www.federalregister.gov.

24. J. N. Trost and J. B. Dunn, 2023. "Assessing the Feasibility of the Inflation Reduction Act's EV Critical Mineral Targets", *Nature Sustainability*, No. 6, 2023, pp. 639-643.

25. "Free Trade Agreements", Office of the United States Trade Representative. n.d., available at: <https://ustr.gov>.

26. J. Bentham, "TechMet Receives US\$50 Million Commitment from US International DFC", *Global Mining Review*, 2023, available at: www.globalminingreview.com.

competition from European and Chinese manufacturers, US companies are increasingly staking their claims on direct supplies in the hope that the verticalization of integrated supply chains isolates them from supply crunch.

Perspectives: IRA's provision not realistic?

These domestic and external mining and refining efforts, coupled with a push for recycling industries, face significant hurdles and are unlikely to reorganize critical minerals supply chains in the short term, thus jeopardizing the goals set out in the IRA. Under its current material requirements, the law is unlikely to be fulfilled, and only a softening of its sourcing rules could align with the geological and geopolitical realities of critical minerals production. While recycling remains a core direction for US mineral supplies, only a limited number of green products, such as EVs, are reaching their end of life. At the same time, the complete overhaul of consumption systems requires immense amounts of minerals that recycling is, thus far, unable to provide. These realities increasingly push EV manufacturers to turn to LFP battery technology, less reliant on critical minerals such as cobalt or nickel. Finally, new extractive frontiers could be explored for the provision of critical minerals, including deep sea mining (DSM), where the US administration seems to be willing to move ahead while calls for it to join the UNCLOS regulation multiply, not least as Russia and China are part of it.²⁷

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